

1 CLAIMS:

2 1. A method of depositing polysilicon comprising:  
3 positioning a substrate within a chemical vapor deposition reactor,  
4 the substrate having an exposed substantially crystalline region and an  
5 exposed substantially amorphous region; and

6 feeding a gaseous precursor comprising silicon to the chemical  
7 vapor deposition reactor under conditions effective to substantially  
8 selectively deposit polysilicon on the crystalline region and not the  
9 amorphous region.

10  
11 2. The method of claim 1 wherein the conditions are void of  
12 plasma.

13  
14 3. The method of claim 1 wherein the conditions include a  
15 time period effective to deposit no more than about 1500 Angstroms of  
16 polysilicon on the crystalline region.

17  
18 4. The method of claim 1 wherein the conditions include a  
19 time period effective to deposit no more than about 1000 Angstroms of  
20 polysilicon on the crystalline region.

21  
22 5. The method of claim 1 wherein the conditions comprise  
23 pressure greater than 30 mTorr.

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1           6.    The method of claim 1 wherein the conditions comprise  
2   pressure greater than 30 mTorr and temperature of less than 800°C.

3  
4           7.    The method of claim 1 wherein the conditions are void of  
5   feeding chlorine containing gas to the reactor.

6  
7           8.    A method of depositing polysilicon comprising:  
8           positioning a substrate within a hot wall low pressure chemical  
9   vapor deposition reactor, the substrate having an exposed substantially  
10   crystalline region, and having an exposed substantially amorphous region  
11   comprising at least one of silicon dioxide and silicon nitride; and  
12   feeding a gaseous silane precursor to the chemical vapor  
13   deposition reactor while providing reactor temperature at from about  
14   650°C to about 850°C and reactor pressure at less than or equal to  
15   about 100 mTorr for a time period effective to deposit a polysilicon  
16   layer substantially selectively on the crystalline region and not the  
17   amorphous region to a thickness not greater than about 1500 Angstroms.

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19           9.    The method of claim 8 wherein the silane comprises a  
20   chlorosilane.

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22           10.   The method of claim 8 wherein the reactor atmosphere  
23   during the time period consists essentially of gaseous silane precursor.

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11. The method of claim 8 wherein the reactor atmosphere during the time period is substantially void of gas comprising a conductivity enhancing dopant.

12. The method of claim 8 wherein the reactor atmosphere during the time period comprises a gas comprising a conductivity enhancing dopant.

13. The method of claim 8 wherein the conditions are void of feeding chlorine containing gas to the reactor.

14. A method of depositing polysilicon comprising:  
positioning a substrate within a chemical vapor deposition reactor, the substrate having an exposed predominately crystalline region and an exposed predominately amorphous region; and  
feeding a gaseous precursor comprising silicon to the chemical vapor deposition reactor under conditions effective to deposit polysilicon on both the crystalline and amorphous regions, the deposited polysilicon having a greater thickness over the crystalline region than over the amorphous region.

15. The method of claim 14 wherein the deposited polysilicon has a thickness of at least about 1500 Angstroms over the crystalline region.

16. The method of claim 14 wherein the conditions comprise temperature of greater than or equal to about 650°C.

17. The method of claim 14 wherein the conditions comprise pressure less than or equal to about 100 mTorr.

18. The method of claim 14 wherein the conditions comprise pressure greater than 30 mTorr.

19. The method of claim 14 wherein the conditions comprise pressure greater than 30 mTorr and temperature of less than 800°C.

20. The method of claim 14 wherein the conditions are void of feeding chlorine containing gas to the reactor.

21. The method of claim 14 wherein the exposed crystalline region is substantially crystalline and the exposed amorphous region is substantially amorphous.

1           22. A method of depositing polysilicon comprising:

2           positioning a substrate within a hot wall low pressure chemical  
3 vapor deposition reactor, the substrate having an exposed predominately  
4 crystalline region, and having an exposed predominately amorphous  
5 region comprising at least one of silicon dioxide and silicon nitride; and

6           feeding a gaseous silane precursor to the chemical vapor  
7 deposition reactor while providing reactor temperature at greater than  
8 or equal to about 650°C and reactor pressure at less than or equal to  
9 about 100 mTorr for a time period effective to deposit polysilicon on  
10 both the crystalline and amorphous regions, the deposited polysilicon  
11 having a greater thickness over the crystalline region than over the  
12 amorphous region.

13  
14           23. The method of claim 22 wherein the deposited polysilicon  
15 has a thickness of at least about 1500 Angstroms over the crystalline  
16 region.

17  
18           24. The method of claim 22 wherein the silane comprises a  
19 chlorosilane.

20  
21           25. The method of claim 22 wherein the reactor atmosphere  
22 during the time period consists essentially of gaseous silane precursor.  
23  
24

1 26. The method of claim 22 wherein the exposed crystalline  
2 region is substantially crystalline and the exposed amorphous region is  
3 substantially amorphous.

4  
5 27. The method of claim 22 wherein the conditions comprise  
6 pressure greater than 30 mTorr.

7  
8 28. The method of claim 22 wherein the conditions comprise  
9 pressure greater than 30 mTorr and temperature of less than 800°C.

10  
11 29. The method of claim 22 wherein the conditions are void of  
12 feeding chlorine containing gas to the reactor.

13  
14 30. A method of depositing polysilicon comprising:  
15 providing a semiconductor wafer having an exposed monocrystalline  
16 silicon region and an exposed substantially amorphous dielectric material  
17 region; and

18 feeding a gaseous precursor comprising silicon to the chemical  
19 vapor deposition reactor under conditions effective to substantially  
20 selectively deposit polysilicon on the monocrystalline silicon region and  
21 not the dielectric material region.

1 31. The method of claim 30 wherein the gaseous precursor  
2 comprising silicon comprises a silane.

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4 32. The method of claim 30 wherein the gaseous precursor  
5 comprising silicon comprises a silane, and the reactor atmosphere during  
6 depositing consists essentially of gaseous silane precursor.

7  
8 33. The method of claim 30 wherein the conditions comprise  
9 pressure greater than 30 mTorr.

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11 34. The method of claim 30 wherein the conditions comprise  
12 pressure greater than 30 mTorr and temperature of less than 800°C.

13  
14 35. The method of claim 30 wherein the conditions are void of  
15 feeding chlorine containing gas to the reactor.

16  
17 36. The method of claim 30 wherein the conditions comprise  
18 temperature of greater than or equal to about 650°C and pressure less  
19 than or equal to about 100 mTorr, and wherein the gaseous precursor  
20 comprising silicon comprises a silane, and the reactor atmosphere during  
21 depositing consists essentially of the silane.

1 37. A method of fabricating a field effect transistor on a  
2 substrate comprising:

3 forming a gate dielectric layer and a gate over semiconductive  
4 material;

5 forming substantially amorphous insulating material over and  
6 laterally proximate the gate;

7 etching through the substantially amorphous insulating material to  
8 expose semiconductive material over at least one desired source/drain  
9 region laterally proximate at least one side of the gate and having the  
10 gate protectively covered with substantially amorphous insulating material  
11 proximate the etched portion;

12 providing the substrate after etching within a chemical vapor  
13 deposition reactor; and

14 feeding a gaseous precursor comprising silicon to the chemical  
15 vapor deposition reactor under conditions effective to substantially  
16 selectively deposit polysilicon on the source/drain region and not on  
17 substantially amorphous material, and forming an elevated source/drain  
18 on the one source/drain region.

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20 38. The method of claim 37 wherein the gaseous precursor  
21 comprising silicon comprises a silane.  
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39. The method of claim 37 wherein the gaseous precursor comprising silicon comprises a silane, and the reactor atmosphere during depositing consists essentially of gaseous silane precursor.

40. The method of claim 37 wherein the conditions comprise pressure greater than 30 mTorr.

41. The method of claim 37 wherein the conditions comprise pressure greater than 30 mTorr and temperature of less than 800°C.

42. The method of claim 37 wherein the conditions are void of feeding chlorine containing gas to the reactor.

43. The method of claim 37 wherein the conditions comprise temperature of less than 800°C and pressure greater than 30 mTorr, and wherein the gaseous precursor comprising silicon comprises a silane, and the reactor atmosphere during depositing consists essentially of the silane.

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1 44. A method of fabricating a field effect transistor on a  
2 substrate comprising:

3 forming a gate dielectric layer and a gate over semiconductive  
4 material;

5 forming doped source/drain regions within semiconductive material  
6 laterally proximate the gate;

7 forming substantially amorphous insulating material over and  
8 laterally proximate the gate;

9 providing the substrate within a chemical vapor deposition reactor;  
10 and

11 feeding a gaseous precursor comprising silicon to the chemical  
12 vapor deposition reactor under conditions effective to substantially  
13 selectively deposit polysilicon on the source/drain regions and not on  
14 substantially amorphous material, and forming elevated source/drains on  
15 the doped source/drain regions.

16  
17 45. The method of claim 44 wherein the conditions are void of  
18 feeding chlorine containing gas to the reactor.

1           46. A method of forming a contact to a substrate comprising:  
2           forming substantially amorphous insulating material over a substrate  
3           node location;

4           etching a contact opening through the amorphous insulating  
5           material over the node location;

6           providing the node location to comprise an outwardly exposed  
7           substantially crystalline surface;

8           providing the substrate with outwardly exposed substantially  
9           crystalline node location surface within a chemical vapor deposition  
10          reactor; and

11          feeding a gaseous precursor comprising silicon to the chemical  
12          vapor deposition reactor under conditions effective to substantially  
13          selectively deposit polysilicon on the outwardly exposed crystalline node  
14          location surface and not on the insulating material.

15  
16          47. The method of claim 46 wherein the crystalline surface  
17          comprises a silicide.

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19          48. The method of claim 46 wherein the crystalline surface  
20          comprises a silicide formed over monocrystalline silicon.

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22          49. The method of claim 46 wherein the conditions comprise  
23          pressure greater than 30 mTorr.

1           50. The method of claim 46 wherein the conditions comprise  
2 pressure greater than 30 mTorr and temperature of less than 800°C.  
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4           51. The method of claim 46 wherein the conditions are void of  
5 feeding chlorine containing gas to the reactor.  
6

7           52. A method of forming a contact to a substrate comprising:  
8 forming substantially amorphous insulating material over a substrate  
9 node location comprising crystalline silicon;  
10 etching a contact opening through the amorphous insulating  
11 material to the crystalline silicon of the node location;  
12 providing the substrate with etched contact opening within a  
13 chemical vapor deposition reactor; and  
14 feeding a gaseous precursor comprising silicon to the chemical  
15 vapor deposition reactor under conditions effective to substantially  
16 selectively deposit polysilicon within the contact opening on the  
17 crystalline silicon of the node location and not on the insulating  
18 material.  
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20           53. The method of claim 52 wherein the crystalline silicon is  
21 monocrystalline silicon.  
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1 54. The method of claim 52 wherein the crystalline silicon is  
2 polycrystalline silicon.  
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4 55. The method of claim 52 wherein the gaseous precursor  
5 comprising silicon comprises a silane, and wherein pressure during  
6 deposition is greater than 30 mTorr.  
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8 56. The method of claim 52 wherein the conditions are void of  
9 feeding chlorine containing gas to the reactor.  
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11 57. A method of forming a capacitor comprising:  
12 providing a substrate within a chemical vapor deposition reactor,  
13 the substrate having an exposed substantially crystalline region and an  
14 exposed substantially amorphous region;

15 feeding a gaseous precursor comprising silicon to the chemical  
16 vapor deposition reactor under conditions effective to substantially  
17 selectively deposit polysilicon on the crystalline region and not the  
18 amorphous region, and forming the polysilicon into a first capacitor  
19 electrode;

20 forming a capacitor dielectric layer over the polysilicon; and

21 forming a second capacitor electrode over the capacitor dielectric  
22 layer.  
23  
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1 58. The method of claim 57 wherein the conditions comprise  
2 pressure greater than 30 mTorr and temperature of less than 800°C.

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4 59. The method of claim 57 wherein the conditions are void of  
5 feeding chlorine containing gas to the reactor.

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- 60. A method of forming a capacitor comprising:  
8 forming a first capacitor electrode over a substrate;  
9 forming a substantially crystalline capacitor dielectric layer over the  
10 first capacitor electrode;  
11 providing the substrate with substantially crystalline capacitor  
12 dielectric layer within a chemical vapor deposition reactor; and  
13 feeding a gaseous precursor comprising silicon to the chemical  
14 vapor deposition reactor under conditions effective to substantially  
15 selectively deposit polysilicon on the crystalline region, and forming the  
16 polysilicon into a second capacitor electrode.

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18 61. The method of claim 60 wherein the conditions comprise  
19 pressure greater than 30 mTorr and temperature of less than 800°C.

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21 62. The method of claim 60 wherein the conditions are void of  
22 feeding chlorine containing gas to the reactor.  
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1 63. The method of claim 60 wherein the crystalline capacitor  
2 dielectric layer comprises barium strontium titanate.  
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4 64. The method of claim 60 wherein the crystalline capacitor  
5 dielectric layer comprises  $Ta_2O_5$ .  
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